

Hansatech

Instruments



M-PEA

Multi-Function Plant Efficiency Analyser

- ✓ Advanced lab-based system for investigation of plant photosynthetic efficiency
- ✓ The only commercially available system for measurements of delayed chlorophyll fluorescence
- ✓ M-PEA-1 variant for prompt fluorescence & P700+ modulated absorbance measurements
- ✓ M-PEA-2 variant as M-PEA-1 with additional measurements of delayed fluorescence & leaf absorbance
- ✓ Sophisticated sensor unit with all optical emitters & detectors in a robust, enclosed housing
- ✓ USB2.0 communications via connection to a Windows® PC
- ✓ Comprehensive Windows® experimental design, data transfer & analysis software



Hansatech Instruments

Hansatech Instruments is a small, British, scientific instrument company located in the heart of rural Norfolk. For over 40 years, our efforts have been concentrated towards the design & manufacture of high quality instrumentation for teaching and research in the fields of cellular respiration and photosynthesis. Our instruments are now in use in a wide range of programs in more than 100 countries throughout the world and have gained an enviable reputation for quality, reliability and excellent price/performance.



Products

Hansatech Instruments product range covers a wide range of applications in the fields of photosynthesis and cellular respiration. We manufacture oxygen measurement systems based on Clark type polarographic oxygen sensors, chlorophyll fluorescence measurement systems for both continuous excitation and pulse-modulated measurement techniques and optical instrumentation for the measurement of sample chlorophyll content.



Support

Purchasers of Hansatech Instruments products can be assured of ongoing support and prompt and efficient attention to enquiries at all times. Customers are encouraged to register their instruments on our website which allows access to our Support Ticketing System in addition to instruments manuals and software upgrades.



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Overview

The M-PEA (Multi-Function Plant Efficiency Analyser) combines high quality fast fluorescence kinetic and P700+ absorbance studies with ground-breaking Delayed Fluorescence (DF) measurements providing one of the most comprehensive systems for the investigation of plant photosynthetic efficiency available.

The M-PEA is a laboratory-based measurement system consisting of a control unit and sophisticated, robust sensor unit housing all optical emitters and detectors for all measurement elements.

The system is controlled from a comprehensive Windows® software package (M-PEA+) which allows complex experiments to be designed, uploaded and executed by the M-PEA hardware. Recorded data is quickly downloaded to the software via a USB2.0 connection.

The control unit is of convenient size with minimal footprint allowing measurements to be made in a busy lab environment where bench space is critical. The front panel consists of a power switch and indicator LED, optical sensor connection and a 4 line LCD display. The rear panel provides input for a 12V DC power supply and a USB2.0 connection socket for interface to the M-PEA+ software running on a Windows® PC.

The optical sensor unit is a robust enclosure designed to incorporate sophisticated electronics which effectively controls all of the light sources and detectors. The M-PEA-1 sensor unit includes a high intensity red actinic source, a far-red light source, the prompt fluorescence detector and the modulated emitter/detector pair for P700+ absorbance measurements. M-PEA-2 additionally includes a high sensitivity delayed fluorescence detector and a detector to measure leaf absorptivity.

All the optics are located behind a quartz window which seals the sensor unit providing effective protection for the optical assemblies against dust, dirt and moisture.

M-PEA Variants

Capability	M-PEA-1	M-PEA-2
Prompt Fluorescence	✓	✓
P700+ Absorbance	✓	✓
Delayed Fluorescence	✗	✓
Relative Absorptivity	✗	✓

Technical Specifications

M-PEA Control Unit

Electronics:

1 x high performance 16 bit microcontroller, 1 x enhanced flash 8 bit controller, Dual channels: 1 x modulated, 1 x non-modulated, 16bit resolution A/D 10µs acquisition rate

Dual 16 bit D/A light source, controller

Memory:

32 Mb internal memory storage

Display:

4 line x 20 character LCD

Recording:

Duration 0.001 - 300 seconds (repeatable up to 100 x per protocol)

Communications:

USB2.0 full speed (12 Mb/s)

Power:

12V @ 1A DC

Operating Conditions:

0 - 40°C

Dimensions:

230 (w) x 190 (d) x 85mm (h). Weight 1.4kg

M-PEA-1 Optical Sensor Unit

Illumination:

Sources Actinic: Focused ultra-bright LED with NIR short pass cut-off filter. Dominant λ 625nm. Spectral half-width 20nm. Max. intensity 5000 $\mu\text{mol s}^{-1}$. Far-red: Focused ultra-bright LED with long pass filter. Max. intensity > 1000 $\mu\text{mol s}^{-1}$

P700+: Optically filtered pulse modulated 820nm LED. Intensity 0 - 100% in 1% steps.

Detectors:

PF: Low noise, fast response PIN photodiode with 730nm ($\pm 15\text{nm}$) bandpass filter.

P700+: Low noise, fast response PIN photodiode with optical bandpass filter.

M-PEA-2 Optical Sensor Unit

Illumination:

Sources As in M-PEA-1 sensor unit

Detectors:

As in M-PEA-1 but with the additional: Delayed fluorescence: High sensitivity wideband avalanche photodiode with 730nm ($\pm 15\text{nm}$) bandpass filter. Leaf absorptivity: Low noise, fast response PIN photodiode

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